

### Assessment #3

Submission deadline: 24th April 2022 11:59pm AEST via Moodle

#### Instruction

Below are the coding tasks that you need to complete individually for assessment 3. You should download the IntelliJ project folder as below and unzip it. Then work on the tasks in the project folder.

 [Assessment3.zip](#)

This assessment is worth 18% of the unit total. It contains 100 marks, which has two components.

- Task correctness weighted 100 and will be converted to 90 marks.
  - Task 1 has 15 marks
  - Task 2 has 6 marks
  - Task 3 has 12 marks
  - Task 4 has 22 marks
  - Task 5 has 20 marks
  - Task 6 has 11 marks
  - Task 7 has 14 marks
- Code readability & documentation has 5 marks.
- Code development has 5 marks.

#### Academic Integrity

Please be reminded of the academic integrity mentioned in Week 01. You should code alone and ask the unit staff for help. Do not post your code in public forums.

#### Task 1 (W5 - 15 marks)

Code the following in Task 1 to demonstrate side effects in methods. Briefly explain step by step how side effect occur to reference types but not to value types as inline comment.

##### Task1a:

Code a calling method that declares an array of `double` type and initialised with 5 sensible values. Call task1b method (called) in task1a method (calling). Display your array before and after to prove side effect has taken place for reference types but not to value types.

##### Task1b:

Code a called method that takes two parameters, an array of `double` as reference type and a double value. In the method, manipulate the argument by incrementing the value of the array. Note that you are not required to manipulate the entire array.

#### Task 2 (W5 - 6 marks)

Code in `task2()` method as below. Using the [String.format](#) method just once, display the integer values 1, 10, 100, 1000 each on its own line right justified. The values must not be hard-coded. Example of the output as below.

```
1
10
100
1000
```

Hints: Inserting the character sequence `\n` in a String embeds a 'line feed' (new line - similar to pressing ENTER when typing words in Notepad) in the string e.g. `"Line1\nLine2"`

#### Task 3 (W5 - 12 marks)

Code in `task3()` method by implementing the following sequence using ArrayList.

1. Declare an array list named `myList` which has the capacity of 10.
2. Add the following numbers: "one", "seven", "five", "three", "eight", "ten".
3. Insert the value "eleven" in between "five" and "three".
4. Print all the elements in the `myList`
5. Delete the second last element in the `myList`
6. Print true if `myList` contains "seven"; false otherwise.

Note: Your code should use the appropriate data types.

#### Task 4 (W6 - 22 marks)

Code a `private` method called `gradeScale` that takes in a parameter `mark` as a String. The mark should be converted to appropriate data types using Java Class libraries and evaluate as below grading scale. If the mark is not within the range, it should return an appropriate error message to the user and [vice versa](#). The method code should use the appropriate selection control structure and the conditions must demonstrate mutually exclusive and collectively exhaustive. The method should only use one return statement.

| Code | Grade                            | Mark   |
|------|----------------------------------|--------|
| HD   | <a href="#">High Distinction</a> | 80-100 |
| D    | <a href="#">Distinction</a>      | 70-79  |
| C    | <a href="#">Credit</a>           | 60-69  |
| P    | <a href="#">Pass</a>             | 50-59  |
| N    | <a href="#">Fail</a>             | 0-49   |

Example of output:

`gradeScale("88")` will return `"High Distinction"` in terminal

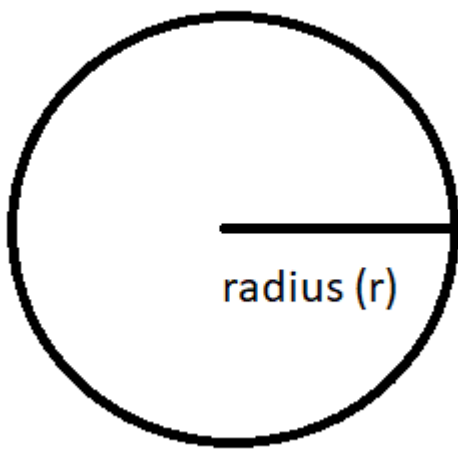
#### Task 5 (W6 - 20 marks)

Code a `private` method called `daysOfTheWeek` that takes in a parameter `day` as a String. Based on the input argument, the method should return the appropriate day (eg. Monday, Tuesday,...etc) using a "switch case" control structure. If the day is not within the range, it should return an appropriate error message to the user and [vice versa](#). The code conditions should demonstrate mutually exclusive and collectively exhaustive. The method should only use one `return` statement.

Example of output:

`daysOfTheWeek("2")` will return `"Tuesday"` in terminal

#### Task 6 (W7 - 11 marks)



Formula:

Circumference of a circle =  $2\pi r$

Area of a circle =  $\pi r^2$

Code in `task6()` method that display the `radius` which is integer and the `ratio` of `area` to `circumference` (perimeter of a circle) which are double for all circles with integer radii beginning with a radius of 1 and continuing while the ratio is less than 30 (exclusive). All variables should be declared with appropriate data types and initialised with sensible values. The code should use appropriate repetition control structure.

Hint: The [Math Class in Java Libraries](#) has methods that gives the value of  $\pi$  and power.

#### Task 7 (W7 - 14 marks)

Code in `task7()` method by drawing a CROSS (X), with its width (horizontal length) defined by the variable below:

```
int size = 5;
```

The shape should be dynamic (not hard-coded) where changing the value of the `size` variable will draw shapes of different sizes of CROSS (X). This shape should be drawn by printing `*` using `for` loop, with the result shown on the terminal. All variables should be declared with appropriate data types and initialised with sensible values.

Example:

for `int size = 5`, this should produce:

```
* *
* *
*
* *
* *
```

for `int size = 10`, this should produce:

```
* * *
* * *
* * *
* * *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
* *
```

#### Code Readability (5 marks)

Overall code submission must be well organised and very easy to follow included but not limited to code indentation, code consistency, effective use of whitespace etc.

#### Code Development & Documentation (5 marks)

Overall code submission demonstrates correct syntax usage and meaningful naming conventions. Code documentations/inline comments are thorough and in detail.

#### Submission Instruction